Exploring the Relationship Between Contraceptive Practices and Sexually Transmitted Infection Prevalence Among Young Adults: A Retrospective Study in New Jersey

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Abstract

Background: *The prevalence of sexually transmitted infections (STIs) remains a significant public health concern, particularly among young adults. In the United States, this age group is increasingly affected by STIs, with a notable rise in cases over recent years. Inconsistent use of contraceptives, especially among users of long-acting reversible contraceptives like hormonal implants and intrauterine devices, has been implicated in this rise. This study aimed to explore the relationships between knowledge, practices, and the history of STIs in young adults.*

Methods: *This retrospective observational analysis study involved 201 young adults aged 18 to 24 from various backgrounds at college campuses and outpatient medical facilities in New Jersey. Data were collected using anonymous survey questionnaires via Qualtrics, an online survey platform.*

Results: *Participants included 63% female respondents (n=126) and 37% males (n=75), with a racial composition of 42.3% Black (n=85), 38.3% Caucasian (n=77), and 19.4% Asian/Pacific Islander (n=39). Ethnically, 81.4% (n=165) were non-Hispanic and 18.6% (n=35) Hispanic, with a mean age of 21 years. Condoms (37.8%, n=88) and oral contraceptives (19.7%, n=46) were the most commonly used forms of contraception. Regarding STI knowledge, limited knowledge showed a strong correlation with a history of STIs (p<0.001), particularly Chlamydia (p=0.003) and Gonorrhea (p=0.004). Re-*

garding contraceptive use with new or non-steady partners, 3.98% (n=8) always used contraception, 38.8% (n=78) used it most of the time, and 50.75% (n=102) sometimes used it. Infrequent contraceptive use was associated with the highest incidence of STIs (p=0.007), especially Gonorrhea (p<0.001) and Chlamydia (p=0.043).

Conclusions: Implementing educational programs targeting young adults could play a crucial role in reducing STI incidence. These programs should emphasize the importance of consistent use of barrier contraceptives during all sexual encounters and clarify that oral contraceptives do not prevent STI transmission, with a focus on educating about Gonorrhea and Chlamydia infections.

Keywords: Sexually transmitted infections, contraceptive methods, and Barrier contraception.

Abbreviations

STIs, Sexually Transmitted Infections

SD, Standard deviation

SEM, Standard error of the mean

t, Student's t distribution

df, degrees of freedom

Introduction

Adolescents, a crucial subset of our population, exhibit heightened sexual activity and are prone to risky sexual behaviors such as early sexual initiation, unplanned sex, multiple sexual partners, and inconsistent use of contraceptives. This behavior places them at a high risk for sexually transmitted infections (STIs) and unintended pregnancies [1]. In the United States, the rate of STIs has been on the rise for six consecutive years [2]. Notably, youths aged 15 to 24 account for half of all newly diagnosed STIs [3]. The World Health Organization [4] reports that over 1 million STIs are acquired daily worldwide, with many being asymptomatic. Annually, there are approximately 374 million new cases of curable STIs, including chlamydia (129 million), gonorrhea (82 million), syphilis (7.1 million), and trichomoniasis (156 million). In 2016, over 490 million people were infected with genital herpes, and around 300 million women were diagnosed with human papillomavirus (HPV) during routine screenings. HPV is a leading cause of cervical cancer and a significant risk factor for anal cancer in men who have sex with men.

Generally, factors contributing to safer sexual behavior and consistent contraceptive use include age, gender, and health literacy, with more knowledgeable individuals engaging in less risky behavior [5]. Long-acting reversible contraceptives (LARCs), such as intrauterine devices (IUDs) and hormonal implants, are highly recommended for female adolescents due to their effectiveness. However, there is a hypothesis that increased LARC usage might lead to higher STI rates. This could be due to reduced condom use and increased sexual risk-taking, given the high pregnancy prevention efficacy and a false sense of security these methods provide compared to others [6]. This

study aims to identify associative factors between primary contraceptive use and STIs in young adults, exploring high-risk sexual behaviors, contraceptive use concepts, STI transmission knowledge, pregnancy, and barriers to seeking medical treatment.

Materials and Methods

To meet the study's objectives, we developed quality improvement initiatives. These included education on STIs, pregnancy prevention, and protection against STIs and unwanted pregnancies. Additionally, the study focused on identifying high-risk sexual behaviors leading to STI exposure among young adults. A 25-question survey assessed the impact of basic knowledge and concepts about STIs, pregnancy, and primary contraceptive use on high-risk sexual behaviors.

We included sexually active young adults aged 18-24 years, both male and female, in the study. We excluded individuals younger than 18 or older than 24, pregnant women, those not using contraceptives, and individuals who had undergone procedures like hysterectomy, oophorectomy, vasectomy, orchiectomy, or tubal ligation. We also excluded individuals with pathological conditions affecting fertility, such as endometriosis, and those identifying as transgender, nonbinary, genderfluid, or sexually inactive.

This study utilized an anonymous questionnaire distributed to 201 individuals who met the inclusion criteria and represented the target population. We excluded 13 respondents who did not use contraceptives, resulting in a final participant count of 188. Some questions allowed multiple responses, which means the response counts may exceed the total number of participants. Participants were recruited through informational flyers that directed them to an online survey platform. The survey was conducted using Qualtrics, a secure online platform that ensures user privacy and confidentiality. Survey responses were collected, processed, and analyzed for exclusions, inaccuracies, or discrepancies. Data analysis was conducted using IBM SPSS Statistics for Windows, Version 22.0. (Armonk, NY: IBM Corp.), including descriptive statistics and variable comparisons using analysis of variance and Chi-Square tests.

The analysis aimed to describe participants' sociodemographic characteristics, sexual behaviors, contraceptive knowledge and use, and STI experiences. The Chi-Square test examined associations between categorical variables like gender, number of sexual partners, contraceptive methods, knowledge areas, and sexual behaviors. Analytical results were rigorously assessed for accuracy and interpreted by researchers to determine their significance and relevance for further discussion and analysis.

Results

Our study focused on participants aged 18-24, with a mean age of 21 years. The gender distribution was 63% female (n=126) and 37% male (n=75). Racial demographics included 42.3% Black (n=85), 38.3% Caucasian (n=77), and 19.4% Asian/Pacific Islander (n=39). Ethnically, 81.4% (n=165) were non-Hispanic and 18.6% (n=35) Hispanic. Sexual attraction was diverse: 53.4% (n=109) were attracted only to males 28% (n=56) only to females, and 18.5% (n=7) to males and females. Condoms were the most used contraceptive method (32.8%, n=64), followed by oral contraceptives (22.2%, n=42). A significant association was found between oral contraceptive use and a history of gonorrhea (p=0.026). Regarding STI knowledge, 70.6% (n=142) of participants had

"some" knowledge, while 29.4% (n=59) had "only a little". Limited knowledge was significantly correlated with a history of STIs (p<0.001), especially Chlamydia (p=0.003) and Gonorrhea (p=0.004). In terms of contraceptive use with new or non-steady partners, 3.98% (n=8) always used contraception, 38.81% (n=78) most of the time, and 50.75% (n=102) sometimes. The "sometimes" use of contraception had the highest correlation with STI incidence (p=0.007), particularly with gonorrhea (p<0.001) and chlamydia (p=0.043).

Table 1 illustrates barrier method usage among participants. Notably, 50.75% (n=102) were occasional condom users with new or steady partners, 38.81% (n=78) used condoms most of the time, and only 3.98% (n=8) always used them. Nearly 5% (n=9) rarely used barriers during sexual intercourse with new or non-steady partners, and approximately 2% (n=4) who never used condoms were excluded from our survey. There also appears to be a statistically significant difference between the number of sexual partners in the last 6 months and the diagnosis of STIs (M=-0.53, SD= 0.63), t=-11.510, df=188, p=0.011 (Table 2).

Table 1: Frequency of barrier (condom) uses with new or non-steady partners

Frequency	N	%
Always	8	3.98%
Most of the time	78	38.81%
Sometimes	102	50.75%
Rarely	9	4.48%
Never	4	1.99%
Total	201	100%

Table 2: Paired Sample Test

Paired Sample Test

	Mean	SD	SEM	95% CI Lower	95% CI Upper	t	df	Significance One-sided p	Significance Two-sided p
BC Method & STI diagnosis	1.11111	0.57735	0.042	1.02827	1.19396	26.458	188	<0.001	<0.001
condom barrier & STI diagnosis	-0.17989	0.75047	0.0549	-0.28758	-0.07221	-3.295	188	<0.001	0.001
no. of sexual partners & STI diagnosis	-0.5291	0.63199	0.0459	-0.61979	-0.43842	-11.51	188	<0.001	<0.001

Abbreviation: BC Method, Barrier Contraceptive Method; SD, Standard deviation; SEM, Standard error of the mean; t, Student's t distribution; df, degrees of freedom

Regarding STI knowledge, 69.7% (n=140) of participants had some knowledge, and 30.3% (n=59) had little knowledge. Around 71% (n=142) had some understanding of STI prevention, while approximately 30% (n=59) had limited knowledge. There is a strong negative association between the knowledge of the spreading of STIs and the prevention of STIs(M=0.87, SD=0.88), $t=13.575, df=188$, p<0.001(Table 2).

The most commonly used contraceptives during the last sexual intercourse included condoms (37.77%, n=88), contraceptive pills (19.74%,n=46), IUDs like Mirena or Skyla (15.88%, n=37), and arm implants such as Nexplanon or Implanon (15.88%, n=26), followed by intramuscular injections of Depo-Provera (4.72%, n=11) and the patch, Ortho Evra (3.86%, n=9). There was no reported use of vaginal rings like NuvaRing. Three (1.3%) relied on natural methods like coitus interruptus, rhythm method, or abstinence. Table 3 details the methods of contraceptive use. The majority of respondents (75.88%, n=151) used contraception during sexual intercourse to prevent STIs and avoid pregnancy, while 19.10% (n=38) primarily aimed to prevent pregnancy. The methods of contraceptive use have a strong correlation with the incidence of STIs among our participants (M=1.11, SD= 0.58), t=26.458,df=188, p <0.001, and the condom use (barrier method) has a protective effect on the incidence of STIs(M= -.018, SD=0.75), t=-3.295,df=188, p< 0.001 (Table 2).

Table 3: Methods of contraceptive use during the last sexual intercourse within the last six months (check all that apply)

Contraception	N	%
Condom	88	37.77%
Birth control pills	46	19.74%
The Shot (e.g., Depo Provera)	11	4.72%
The Patch (e.g., ortho Evra)	9	3.86%
The ring (e.g., NuvaRing)	0	0.00%
Intrauterine device (e.g., Mirena, Skyla, or ParaGard)	37	15.88%
Arm implant (e.g., Nexplanon or Implanon)	26	15.88%
Other	3	1.29%
No contraception	13	5.58%
No sexual intercourse	0	0.00%
Total	233	100%

Gonorrhea was the most prevalent STI, constituting 28.25% (n=89) of all cases, followed by chlamydia (21.27%, n=67) and trichomonas (20.63%, n=65). Herpes diagnoses were present in 13.33% (n=42) of participants, while 8.25% had never been diagnosed with an STI (Table 4).

Table 4: Prevalence of STIs among participants within the last six months (check all that apply)

STIs Diagnosed Within Six Months	N	%
Chlamydia	67	21.27%
Gonorrhea	89	28.25%
Genital warts	11	3.49%
Herpes	42	13.33%
NGU/NSU syphilis	12	3.81%
Trichomonas	65	20.63%
HIV	1	0.32%
Other	2	0.63%
Never diagnosed	26	8.25%
Total	315	100%

Abbreviation: STI, sexually transmitted infection.

Treatment for STIs was most commonly sought in doctors' offices (53.4%, n=164), followed by STI clinics (34.2%, n=105) and community health clinics (3.3%, n=10). The barriers to getting tested for STIs included perceptions of not being at risk (56.73%, n=177), fear of social judgment (25.48%, n=81), lack of understanding about the implications of a positive test (6.37%, n=20), and unfamiliarity with the testing process (5.41%, n=17). These reasons are detailed in Table 5. However, most of our participants (approximately 85%, n=168) sought medical attention when they deemed it necessary. Barriers to seeking healthcare included beliefs that the problem would resolve on its own (approximately 39%, n=181), fear of provider reactions (23.97%, n=111), concerns about cost (approximately 15%, N=68), embarrassment

(nearly 16%, n=72), and not wanting parents to know about their sexual activity (nearly 4%, n=20; Table 6).

Table 5: Reasons for not getting STIs testing (check all that apply)

Reasons for Avoiding STI Testing	N	%
Never had sexual intercourse	0	0.00%
Too expensive	2	0.64%
Afraid of what people might think	81	25.80%
Do not think self at risk	177	56.73%
Do not want to know if one has something	5	1.99%
Do not know where to go to get tested	12	3.82%
Do not know what is involved in getting tested	17	5.41%
Do not know what is means to have a positive test	20	6.37%
Other	0	0.00%
Total	314	100%

Table 6: Reasons for not seeking professional health care(check all that apply)

Reasons for Avoidance of Health Care Services	N (response)	%
Did not know whom to go see	9	1.94%
No one available to go along	2	0.43%
Did not want parents to know about my sexual activity	20	4.32%
Afraid of what the providers would say	111	23.97%
Thought the problem would go away	181	39.09%
Worried about the cost	68	14.69%
Embarrassed	72	15.55%
Other	0	0.00%
Total	463	100%

We examined the correlation between STI prevalence and various factors including sex, age, number of sexual partners in the last six months, contraceptive methods used, and knowledge of STI prevention. The use of oral contraceptives was the only factor with a significant association with a history of gonorrhea (p=0.026). Limited knowledge of STI transmission and prevention correlated with a history of STIs (p<0.001), particularly Chlamydia (p=0.003) and Gonorrhea (p=0.004). Contraceptive use with a new or non-steady partner was also significant; occasional use was most strongly associated with STI incidence (p=0.007), especially Gonorrhea (p<0.001) and chlamydia (p=0.043). The number of sexual partners, types of sexual intercourse, and frequency of sexual activity were not significant factors in STI prevalence.

Discussion

Our study explores the relationship between primary contraceptive use and STIs among young adults. Key aspects of this research include focusing on a high-risk age group in New Jersey, analyzing epidemiological trends, and evaluating factors such as age, sex, pathogen types, high-risk sexual behaviors, understanding of primary contraceptive use, knowledge of STI transmission and prevention, and barriers to seeking medical treatment.

Gonorrhea was the most common STI, accounting for over a quarter of all cases. This was followed by chlamydia and trichomonas, with herpes also being notably present. Interestingly, a small percentage of participants had never been diagnosed with an STI. These findings broadly align with the trends observed in national and global data over recent years [3,4], suggesting a consistent pattern in the prevalence and distribution of STIs among young adults.

We observed a significant association between sporadic oral contraceptive use during sexual activity with new or non-steady partners, limited STI knowledge, and the prevalence of STIs, particularly gonorrhea and chlamydia. However, this association may be influenced by confounding factors [7,8]. For instance, young adults using LARCs, such as hormonal implants and IUDs, may experi-

ence a false sense of security due to these methods' high efficacy in preventing pregnancy. This perception could lead to inconsistent or non-use of barrier methods (male and female condoms) and increased sexual risk-taking behaviors [9]. Additionally, the need to reduce social stigma and minimize barriers to seeking medical care for STI testing or treatment emerged as crucial factors, especially in high-risk young adult populations [8,10-14].

Effective strategies are needed to curb the rising STI rates, particularly among young adolescents, who predominantly use condoms for contraception. Promoting safe sexual practices and consistent condom use is essential. Providing adolescent-focused comprehensive sexual health education and confidential reproductive health services is crucial [2,8].

Despite growing awareness of STIs among young adults, there remains a significant knowledge gap regarding the effectiveness of barrier methods (condoms) in preventing STIs, including human immunodeficiency virus and genital herpes [15]. This lack of knowledge significantly contributes to the incidence of STIs. Therefore, implementing educational programs targeting young adults could help reduce STI rates [10,11,16].

This study had several important limitations that warrant consideration. Firstly, the sample size and demographics were restricted to young adults aged 18-24 in New Jersey, limiting the generalizability of the findings to other populations, age groups, and geographical areas. The reliance on self-reported data, particularly on sensitive subjects like sexual behavior and contraceptive use, raises concerns about potential biases such as underreporting or overreporting due to social desirability or recall bias. The study's design captures data at a single point in time, which limits the ability to establish causality between contraceptive use and STI incidence.

Furthermore, the study did not control for confounding variables. Factors such as socioeconomic status, education level, access to healthcare, and cultural influences could significantly impact the results. The exclusion of individuals who never used condoms may skew the understanding of condom use and its relationship to STI rates. Additionally, the study's exclusion of non-binary genders could limit the comprehensiveness of the sexual health data gathered. The study's assessment of STI knowledge did not detail the depth or accuracy of this knowledge, leading to potential vagueness in categorizing participants' understanding as "some" or "little." Relying primarily on questionnaires for data collection could limit the depth of insights, which might have been enriched by incorporating additional methods like interviews or focus groups. There is also the potential for reporting errors inherent in any study relying on survey data. Lastly, the study's categorization of contraceptive use (e.g., "sometimes", "most of the time") lacked specific definitions, potentially leading to variability in how participants interpreted these terms. These limitations highlight the need for cautious interpretation of the study's findings and suggest areas for improvement in future research.

Conclusions

The lack of understanding among young adults in our study about the effectiveness of barrier methods like condoms in preventing STIs, including HIV and genital herpes, suggests that educational programs could be vital in reducing STI rates. These programs should emphasize the importance of consistent barrier method use during all sexual encounters and clarify that oral contraceptives and other long-term contraceptive methods do not pre-

vent STI transmission. Special attention should be given to educating about Gonorrhea and Chlamydia infections, as these were prevalent in our study.

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